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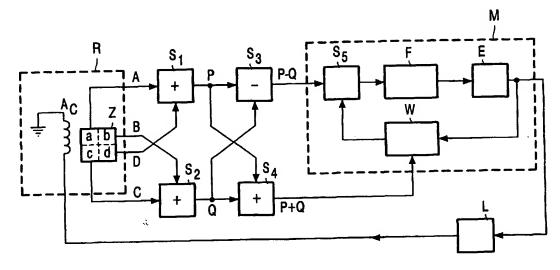
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(54) Title: SERVO SYSTEM, APPARATUS COMPRISING A SERVO SYSTEM, SIGMA DELTA MODULATOR, AND INTE-GRATED CIRCUIT COMPRISING A SIGMA DELTA MODULATOR



(57) Abstract: A servo system comprising an analog sigma delta modulator for generating a normalized digital error correction signal from first and second analog control signals. The sigma delta modulator comprises an analog low-pass filter, a quantizer delivering the digital error correction signal and a multiplying DA-converter in feedback arrangement between the output of the quantizer and the input of the low-pass filter for multiplying the feedback signals with the sum of the analog control signals.





CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

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PCT/TB2004/050082 A. CLASSIFICATION OF SUBSIFIC 7 G06J1/00 G11B7/09 According to International Patent Classification (IPC) or to both national classification and IPC B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) H03M IPC 7 G06J G11B Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data, PAJ, INSPEC, COMPENDEX, IBM-TDB C. DOCUMENTS CONSIDERED TO BE RELEVANT Relevant to claim No. Citation of document, with indication, where appropriate, of the relevant passages Category 9 1,8 Α EP 0 501 570 A (PHILIPS NV) 2 September 1992 (1992-09-02) cited in the application column 6, line 30 - line 33 column 7, line 8 - column 8, line 6; figures 1,2a,10 US 5 187 482 A (GARVERICK STEVEN L ET AL) 1,8 Α 16 February 1993 (1993-02-16) abstract; figure 3 Patent family members are listed in annex. Further documents are listed in the continuation of box C. Special categories of cited documents: "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the *A* document defining the general state of the art which is not considered to be of particular relevance invention *E* earlier document but published on or after the international "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to filing date involve an inventive step when the document is taken alone "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "Y" document of particular relevance; the claimed invention cannot be considered to involve an invention step when the document is combined with one or more other such docu-"O" document referring to an oral disclosure, use, exhibition or ments, such combination being obvious to a person skilled other means document published prior to the international filing date but later than the priority date claimed "&" document member of the same patent family Date of mailing of the international search report Date of the actual completion of the International search 09/08/2004 3 August 2004 **Authorized officer** Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016

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Inter 1 Application No PCT/IB2004/050082

Patent document cited in search report		Publication date		Patent fammember(s)	Publication date
EP 0501570	A	02-09-1992	DE DE EP JP JP KR US	69216441 D1 69216441 T2 0501570 A1 3273804 B2 5073102 A 224513 B1 5249116 A	20-02-1997 10-07-1997 02-09-1992 15-04-2002 26-03-1993 15-10-1999 28-09-1993
US 5187482	Α	16-02-1993	NONE		